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10/589,509	10/13/2006	Eric Foucault	065691-0462	8318

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EXAMINER	
BARBEE, MANUEL L	
ART UNIT	PAPER NUMBER
2857	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/589,509	FOUCAULT ET AL.	
	Examiner	Art Unit	
	MANUEL L. BARBEE	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 April 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13 and 15-23* is/are rejected.

7)☒ Claim(s) *14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 23 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 23 appears to state that the pressure difference may be simultaneously positive and negative. The claim should clearly show that the pressure difference may only be positive or negative alternatively.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 4, 5, 7, 8, 11-13, 15 and 19-23 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent Application Publication 2003/0136196 to Wiklund et al. (Wiklund).

As per claim 1:

With regard to a flow-velocity measuring device equipped with two pressure take-offs in the wall and a pressure-difference measuring device, Wiklund teaches a differential pressure flow sensor with two pressure sensors used to measure pressure difference (par. 22, Fig. 8). With regard to a calculating resource to calculate flow, in real time, by solving an equation that relates the instantaneous flow to the pressure difference, where the pressure difference is positive or negative in the equation depending on variations in the speed of the fluid flow or the direction of the fluid flow, Wiklund teaches using the pressure difference to calculate the flow (par. 24, Figs. 7 and 8).

As per claim 4:

With regard to a temperature measuring probe, Wiklund teaches a temperature sensor (Fig, 8, temperature sensor 58).

As per claim 5:

With regard to the calculation resource being designed to ascertain density of the fluid by having the temperature measured by the temperature measuring probe and calculating the instantaneous mass flow of the fluid, Wiklund teaches using the temperature to determine the density and flow (par. 37).

As per claim 7:

With regard to calculating the mass flow of a fluid that is compressible by means of an absolute pressure measurement and a temperature measurement and by solving the equation relating the instantaneous flow to the pressure difference,

Wiklund teaches using temperature and differential pressure to determine flow (par. 39).

As per claim 8:

With regard to a narrowing tube, Wiklund teaches a narrowing tube (Fig. 14).

As per claim 11:

With regard to a differential pressure sensor connected to the two pressure take-offs, Wiklund teaches a differential pressure flow sensor with two pressure sensors used to measure pressure difference (par. 22, Fig. 8).

As per claim 12:

With regard to a set of two relative pressure sensors connected to the two pressure take-offs, Wiklund teaches a differential pressure flow sensor with two pressure sensors used to measure pressure difference (par. 22, Fig. 8).

As per claim 13:

With regard to an analogue or digital electronic calculator, Wiklund teaches a microprocessor (Fig. 8, microprocessor 54).

As per claim 15:

With regard to measurement of a difference between two pressures, Wiklund teaches a differential pressure flow sensor with two pressure sensors used to measure pressure difference (par. 22, Fig. 8). With regard to a calculating the flow of a fluid by solving an equation that relates the instantaneous flow to the pressure difference, where the pressure difference is positive or negative in the equation depending on variations in the speed of the fluid flow or the direction of

the fluid flow, Wiklund teaches using the pressure difference to calculate the flow (par. 24, Figs. 7 and 8).

As per claim 19:

With regard to a stage for acquisition of the fluid temperature, Wiklund teaches a temperature sensor (Fig, 8, temperature sensor 58).

As per claim 20:

With regard to a stage for acquisition of the absolute static pressure of the fluid, Wiklund teaches measuring static pressure (par. 38).

As per claim 21:

With regard to including absolute static pressure and fluid temperature in the equation taking account of the direction of flow, Wiklund teaches using temperature and static pressure to determine flow (pars. 38, 39).

As per claim 22:

With regard to calculating the mass flow of a fluid that is compressible by means of an absolute pressure measurement and a temperature measurement and by solving the equation relating the instantaneous flow to the pressure difference, Wiklund teaches using temperature, static pressure and differential pressure to determine flow (par. 39).

As per claim 23:

With regard to a flow-velocity measuring device equipped with two pressure take-offs in the wall and a pressure-difference measuring device, Wiklund teaches a differential pressure flow sensor with two pressure sensors used to measure

pressure difference (par. 22, Fig. 8). With regard to a calculating resource to calculate flow, in real time, by solving an equation that relates the instantaneous flow to the pressure difference, where the pressure difference is positive or negative in the equation depending on variations in the speed of the fluid flow or the direction of the fluid flow, Wiklund teaches using the pressure difference to calculate the flow (par. 24, Figs. 7 and 8).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 2, 3, 6 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wiklund in view of US Patent No. 5,493,512 to Puebe et al. (Puebe). As per claim 2:

Wiklund teaches all the limitations of claim 1 upon which claim 2 depends. Wiklund does not teach an equation that includes instantaneous flow and a term representing the differential coefficient with time of the instantaneous flow. Puebe teaches an equation that includes a derivative of volume flow and instantaneous flow (col. 7, equation 13). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the flow sensor, as taught by Wiklund, to include an equation with the terms, as taught by

Puebe, because then instantaneous local velocity of unsteady flow would have been determined (Puebe, col. 2, lines 57-60).

As per claim 3:

Wiklund teaches all the limitations of claim 1 upon which claim 3 depends. Wiklund does not teach a differential equation of the form shown in claim 3. Puebe teaches an equation that includes a derivative of volume flow and instantaneous flow (col. 7, equation 13). Flow is represented by the variable v. The equation includes a term for the differential coefficient with time of the flow. The term with the variable ρ corresponds to a function that depends on the geometry of the system. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the flow sensor, as taught by Wiklund, to include an equation with the terms, as taught by Puebe, because then instantaneous local velocity of unsteady flow would have been determined (Puebe, col. 2, lines 57-60).

As per claim 6:

With regard to a probe for measuring the absolute static pressure of the fluid, Wiklund teaches measuring static pressure (par. 38).

As per claim 16:

Wiklund teaches all the limitations of claim 15 upon which claim 16 depends. Wiklund does not teach an equation that includes instantaneous flow and a term representing the differential coefficient with time of the instantaneous flow. Puebe teaches an equation that includes a derivative of volume flow and

instantaneous flow (col. 7, equation 13). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the flow sensor, as taught by Wiklund, to include an equation with the terms, as taught by Puebe, because then instantaneous local velocity of unsteady flow would have been determined (Puebe, col. 2, lines 57-60).

As per claim 17:

Wiklund teaches all the limitations of claim 15 upon which claim 17 depends. Wiklund does not teach a differential equation of the form shown in claim 3. Puebe teaches an equation that includes a derivative of volume flow and instantaneous flow (col. 7, equation 13). Flow is represented by the variable v. The equation includes a term for the differential coefficient with time of the flow. The term with the variable ρ corresponds to a function that depends on the geometry of the system. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the flow sensor, as taught by Wiklund, to include an equation with the terms, as taught by Puebe, because then instantaneous local velocity of unsteady flow would have been determined (Puebe, col. 2, lines 57-60).

As per claim 18:

Wiklund teaches all the limitation of claim 15 upon which claims 18 depends. Wiklund does not teach that the direction of the flow is included in the term which depends on the geometry of the system and the flow. Puebe teaches an equation that includes a derivative of volume flow and instantaneous flow (col. 7,

equation 13). Flow is represented by the variable v. The equation includes a term for the differential coefficient with time of the flow. The term with the variable ρ corresponds to a function that depends on the geometry of the system. Since the equation includes a term for the derivative of the flow, the rate of change of the flow would affect whether instantaneous flow and indicate the direction of flow. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the flow sensor, as taught by Wiklund, to include an equation with the terms, as taught by Puebe, because then instantaneous local velocity of unsteady flow would have been determined (Puebe, col. 2, lines 57-60).

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wiklund in view of US Patent No. 3,967,504 to Akeley (Akeley).

Wiklund teaches all the limitations of claim 1 upon which claim 9 depends. Wiklund does not teach a diaphragm. Akeley teaches measuring pressure difference with a diaphragm (col. 1, lines 7-29). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the flow sensor, as taught by Wiklund, to include a diaphragm, as taught by Akeley, because then a well known method of measuring pressure difference pneumatically would have been available.

8. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wiklund in view of US Patent No. 5,365,795 to Brower, Jr. (Brower).

Wiklund teaches all the limitations of claim 1 upon which claim 10 depends. Wiklund does not teach a venturi. Brower teaches a venturi for measuring pressure change (col. 10, lines 56-65; Fig. 5). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the flow sensor, as taught by Wiklund, to include a venture, as taught by Brower, because then less flow losses would have been produced (col. 10, lines 56-63).

Allowable Subject Matter

9. Claim 14 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

10. Applicant's arguments filed 10 April 2008 have been fully considered but they are not persuasive.

Applicant states that Wiklund does not describe each of the features of independent claims 1 and 15. Applicant states that unlike the invention of claim 1, Wiklund's microprocessor is configured to calculate the flow rate of the fluid flow as a function of the absolute value of a pressure signal. Claims 1 and 15 require solving an equation that relates the instantaneous flow to the pressure difference, where the pressure difference is positive or negative in the equation depending on variations in the speed of fluid flow in the conduit and/or the direction of the fluid flow. Therefore absolute value of the differential pressure meets the claim limitations since the claim allows a positive or negative value to be used in the equation. Further, even though

Wiklund teaches using the absolute value of the differential pressure signal, Wiklund clearly teaches that the differential pressure may be positive or negative depending on the direction of flow (par. 24). As pointed out by Applicant, the variable "h" in the equation shown in par. 24 of Wiklund is the absolute value of the differential pressure (par. 35). However, the actual differential pressure value is considered to be in the equation and may be positive or negative before the absolute value of the differential pressure is determined.

With regard to claim 1, Applicant states that Wiklund does not describe a system designed to calculate flow in real time. Applicant states that none of the equations in Wiklund are dependent on time. However, claim 1 does not require that the equations be dependent on time. Wiklund teaches calculating the flow with a microprocessor (par. 24) and this teaching is considered to meet the claim language for calculating flow in real time.

With regard to rejections under 35 U.S.C. 103(a), Applicant states that the ordinary artisan would not have had a level of skill sufficient to render the invention obvious to that ordinary artisan. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the flow sensor, as taught by Wiklund, to include an equation with the terms, as taught by Puebe, because then instantaneous local velocity of unsteady flow would have been determined (Puebe, col. 2, lines 57-60).

Applicant further states that Wiklund explicitly teaches that the absolute value of h is utilized, and necessarily teaches away from a calculation resource where h could

be negative. However, as discussed above, the claim only requires that the differential pressure value be positive or negative. Further, the step of taking the absolute value of a measurement that may be positive or negative does not teach away from the fact that the value measurement may be positive or negative.

With regard to Peube, Applicant states that equation 13 in column 7 of Peube is used for calculating the flow when the conduit is too short to present a significant pressure difference citing column 7, lines 10-15. Applicant points out that a term P_O in equation 13 corresponds to the atmospheric pressure but not to a static pressure measured in the conduit. Applicant states that therefore, the rationale proffered in the Office Action for modifying Wiklund in view of Peube is not correct. However, though only one pressure value is measured, clearly the equation determines a pressure difference and could be used with two measured pressures instead of one pressure and the atmospheric pressure. Nothing in the cited portions of Peube rules out the motivation provided in the rejection.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MANUEL L. BARBEE whose telephone number is (571)272-2212. The examiner can normally be reached on Monday-Friday from 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eliseo Ramos-Feliciano can be reached on 571-272-7925. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Manuel L. Barbee/
Primary Examiner, Art Unit 2857

mlb

July 14, 2008